CLAIMS

1. A data structure stored on computer readable media for managing a complex work order, comprising

an identifier for a work order that indicates it is a complex work order;

a set of N common fields that identify features of the complex work order, where N is ≥ 1;

a set of M member sub-orders that are part of the complex work order, where M is ≥ 1, and where the member sub-orders in the set include an identifier for the member sub-order, a set of P precedence criteria, where P is ≥ 0, and where the precedence criteria identifies a predecessor sub-order to be started or completed prior to starting the member sub-order; and

2. The data structure of claim 1 where the set of M member sub-orders further include a set of Q fields containing specific information for the member sub-orders, where Q is ≥ 0.

3. The data structure of claim 1 where the set of M member sub-orders further includes an identifier of a type for the member suborders.

4. The data structure of claim 3 wherein the type of member sub-orders is selected from the group consisting of undated, current, future, splittable, and multiday sub-orders.

5. A database stored on computer readable medium including records containing the data structure of claim 1.

6. The data structure of claim 2 wherein at least one of the N common fields, the set of M member sub-orders, the set of P precedence criteria and the set of Q specific fields are modifiable.

7. The data structure of claim 1 wherein a member sub-order is selected from a database containing records of ordinary orders, where the record for the ordinary orders includes an identifier for the ordinary order and specific information for the ordinary order, where the identifier for the member sub-order is the same as the identifier for ordinary order and where the set of Q specific fields is the same as the specific information for the ordinary order.

8. The data structure of claim 1 wherein the precedence criteria identifies a predecessor sub-order to be completed prior to starting the member sub-order.

9. The data structure of claim 1 wherein the precedence criteria identifies a successor sub-order to be started after completion of the member sub-order.

10. The data structure of claim 1 wherein the precedence criteria identifies an elapsed time period for when one member sub-order can start after a start time of a predecessor sub-order.

11. The data structure of claim 1 wherein the precedence criteria identifies that one member sub-order can start simultaneously or after the start time of a predecessor sub-order.

12. The data structure of claim 1 wherein the Q specific fields include an indication of a skill level of a technician needed to work on the member sub-order.

13. The data structure of claim 1 wherein the Q specific fields include an indication of equipment needed to work on the member sub-order.

14. The data structure of claim 1 wherein the Q specific fields include an indication of a duration of time needed to complete the member sub-order.

15. The data structure of claim 1 wherein the Q specific fields include an indication of an identity of a technician needed to work on the member sub-order.

16. In a computer, a process for creating a complex work order comprising, identifying a work order as a complex work order by an identifier;

selecting a set of M member sub-orders associated with the complex work order, where M is ≥ 1;

relating the member sub-orders by a set of P precedence criteria, where P is ≥ 0, and where the precedence criteria identifies a predecessor sub-order to be started or completed prior to starting the member sub-order;

and entering the identifier of the complex work order, the selected M member sub-orders and the P precedence criteria into a data structure stored on computer readable media configured with instructions to communicate data regarding the complex work order to a workforce management system.

17. The process of claim 16 further including identifying a set of Q fields containing specific information for the M member sub-orders, where Q is ≥ 0; and entering the Q specific fields into the data structure.

18. The process of claim 17 wherein identifying the set of Q specific fields includes selecting the M member sub-orders from a database that contains the set of Q specific for each M member sub-orders.

19. In a computer, a process for managing a complex work order comprising,

identifying a work order as a complex work order;

selecting a set of M member sub-orders associated with the complex work order, where M is ≥ 1;

relating the member sub-orders by a set of P precedence criteria, where P is ≥ 0, and where the precedence criteria identifies a predecessor sub-order to be started or completed prior to starting the member sub-order;

communicating a proposed start time for commencing work on a member sub-order to a workforce management system configured with a data structure that stores the P precedence criteria for the member sub-orders; and

validating whether the proposed start time satisfies the precedence criteria prior to starting work on the member sub-order.

20. The process of claim 19 further including identifying a set of Q specific fields for the member sub-orders, where the Q specific fields includes an indication of the duration of time for completing the member sub-order.

21. The process of claim 19 wherein communicating the proposed start time is done by wireless communication from a technician who is available to commence work on the member sub-order.

22. The process of claim 21 wherein the technician communicates the proposed start time by transmitting an on-site or en-route message regarding the member sub-order to the workforce management system.

23. The process of claim 19 further including communicating a start or completion signal to the workforce management system wherein the start or completion signal indicates the start time or completion time for a predecessor sub-order.

24. The process of claim 23 wherein the workforce management system uses the start or completion signal for the predecessor sub-order to validate whether the precedence criteria have been satisfied with respect to the member sub-order.

25. The process of claim 19 wherein validating the proposed start time includes sending a warning or alert signal to a technician or dispatcher if the precedence criteria are not satisfied.

26. The process of claim 25 wherein the warning or alert signal is a visual display identifying the member sub-order.

27. The process of claim 25 wherein the warning or alert signal includes an identification of the predecessor sub-order that has not been completed.

28. The process of claim 25 wherein the warning or alert signal is provided on a visual display and has one appearance indicating that the precedence criteria is satisfied and a second appearance indicating the precedence criteria is not satisfied.

29. The process of claim 19 wherein communicating the proposed start time is done by a dispatcher, and the dispatcher assigns the proposed start time for the member sub-order to a technician if the proposes start time is validated.

30. In a computer, a process for managing a complex work order comprising,

identifying a work order as a complex work order;

selecting a set of M member sub-orders associated with the complex work order, where M is $\geq$ 1;

relating the member sub-orders by a set of P precedence criteria, where P is $\geq$ 0, and where the precedence criteria identifies a predecessor sub-order to be started or completed prior to starting the member sub-order; and

scheduling appointment times for starting work on each member sub-order so that the appointment times satisfy the precedence criteria for each member sub-order.

31. The process of claim 30 further including validating whether the precedence criteria is satisfied prior to scheduling the member sub-order.

32. The process of claim 30 further including identifying a set of Q specific fields for the member sub-orders, where the Q specific fields includes an indication of the duration of time for completing the member sub-order.

33. The process of claim 32 wherein scheduling the appointment times to satisfy the precedence criteria includes assessing the duration of time for the member sub-orders.

34. The process of claim 30 wherein scheduling the appointment times includes selecting an appointment time window for starting work on the member sub-orders.

35. The process of claim 34 further including validating whether the precedence criteria is satisfied prior to starting work on the member sub-order.

36. The process of claim 34 further including communicating a start or completion signal to a workforce management system that includes a data structure that stores the P precedence criteria for the member sub-orders, and where the start or completion signal indicates the start time or completion time for a predecessor sub-order.

37. The process of claim 36 wherein the workforce management system uses the start or completion signal for the predecessor sub-order to validate whether the precedence criteria have been satisfied with respect to the member sub-order prior to starting work on the member sub-order.

38. The process of claim 37 wherein validating whether the precedence criteria have been satisfied includes sending a warning or alert signal to a technician or dispatcher if the precedence criteria are not satisfied.

39. The process of claim 38 wherein the warning or alert signal is a visual display identifying the member sub-order.

40. The process of claim 38 wherein the warning or alert signal includes an identification of the predecessor sub-order that has not been completed.

41. The process of claim 38 wherein the warning or alert signal is provided on a visual display and has one appearance indicating that the precedence criteria is satisfied and a second appearance indicating the precedence criteria is not satisfied.

42. In a computer, a process for managing a complex work order comprising,
   identifying first and second sub-orders required to fulfill the complex order;
   relating the first sub-order to the second sub-order by a precedence criteria;
   scheduling the first sub-order to a first appointment time for starting work;

scheduling the second sub-order a second appointment time for starting work so that the first appointment time and the second appointment time satisfy the precedence criteria;

selecting a first new appointment time for the first or second sub-order;

determining whether the appointment time for the other of the first or the second sub-order requires reassignment to satisfy the precedence criteria with respect to the first new appointment time, and

rescheduling the first or second sub-orders to the first new appointment time and if required, rescheduling the second sub-order to a second new appointment time, so that the resulting scheduled appointment times for the first and second sub-orders satisfy the precedence criteria.

43. The process of claim 42 further including identifying a set of Q specific fields for the member sub-orders, where the Q specific fields includes an indication of the duration of time for completing the member sub-order.

44. The process of claim 43 wherein scheduling the appointment times to satisfy the precedence criteria includes assessing the duration of time for the member sub-orders.

45. The process of claim 42 wherein scheduling the appointment times includes selecting appointment time windows for starting work on the member sub-orders.

46. The method of claim 42 wherein the appointment times are scheduled for a plurality of individual technicians.

47. The process of claim 42 wherein the selecting, determining and rescheduling are repeated with different selections of new appointment times to produce a plurality of resulting scheduled appointment times, each of which is a solution that satisfies the precedence criteria, and the solution that is most optimal is selected.

48. The process of claim 47 wherein the most optimal solution selected is the solution most optimal for each of a plurality of individual technicians.

49. The process of claim 47 wherein the most optimal solution selected is the solution most optimal for a workforce of technicians as a whole.

50. A system for managing distribution of a plurality of work orders to a workforce of mobile service representatives comprising;

means for communicating a request for work orders that include complex work orders to a computer system that includes a data structure for identifying a work order as a complex work order, where the data structure includes,

an identifier for the complex order;

a set of N common fields that identify features of the complex work order, where N is ≥ 1;

a set of M member sub-orders that are part of the complex work order, where M is ≥ 1, and where the sub-orders in the set include:

an identifier for the member sub-orders, a set of P precedence criteria that relate a member sub-order to suborders that are to be started or completed prior to starting the member sub-order, and where P is ≥ 0, and optionally including set of Q fields containing specific information for the sub-orders, where Q is ≥ 0.

means for communicating a completion signal indicating completion of predecessor suborders from a mobile service technician to a workforce management system stored on computer readable media,

means for communicating a validation signal from the workforce management system to a worker who proposes a start time for a member sub-order to the workforce management system, where the workforce management system validates whether the selected start time satisfies the precedence criteria for the member sub-order with respect to the whether the P predecessor sub-orders have been completed.

51. The system of claim 50 where the means of communicating between the worker and the workforce management system includes wireless communication between a portable electronic device having a visual display and a host computer that stores the workforce management system on computer readable media.

52. The system of claim 50 where the means for communicating the work order requests includes a network computer system with a transaction broker program stored on computer readable media with instructions parsing and translating the work order requests to the workforce management system configured with the data structure for a complex work order.

53. A system for managing distribution of a plurality of work orders to a workforce of service representatives comprising;

a workforce management system stored on computer readable medium that is configured with a data structure for identifying a work order as a complex work order including,

an identifier for the complex work order;

a set of N common fields that identify features of the complex work order, where N is ≥ 1;

a set of M member sub-orders that are part of the complex work order, where M is ≥ 1, and where the sub-orders in the set include:

an identifier for the member sub-orders, a set of P precedence criteria that relate a member sub-order to suborders that are to be started or completed prior to starting the member sub-order, and where P is ≥ 0, and optionally including set of Q fields containing specific information for the sub-orders, where Q is ≥ 0.

a first wireless data communication device configured to transmit a completion signal indicating completion of the predecessor suborders from to the workforce management system,

a second wireless data communication device configured to transmit a validation signal from a workforce management system to a worker who proposes a start time for a member sub-order; where the workforce management system is configured to validate whether the selected start time satisfies the precedence criteria for the member sub-order with respect to the whether the P predecessor sub-orders have been completed.

54. The system of claim 53 wherein the workforce management system configured with the data structure is stored on a host computer adapted to transmit data over a

computer network, and where the first and second wireless data communication devices are adapted to communicate over the computer network.

55. Computer readable media containing instructions for implementing the process of claim 16.

56. Computer readable media containing instructions for implementing the process of claim 19.

57. Computer readable media containing instructions for implementing the process of claim 30.

58. Computer readable media containing instructions for implementing the process of claim 42.